Transportation Synthesis Report

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Mitigation of the Secondary Impacts of Transportation Projects

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Transportation Synthesis Reports (TSRs) are brief summaries of currently available information on topics of interest to WisDOT technical staff in highway development, construction and operations. Online and print sources include NCHRP and other TRB programs, AASHTO, the research and practices of other state DOTs, and related academic and industry research. Internet hyperlinks in TSRs are active at the time of publication, but changes on the host server can make them obsolete.

REQUEST FOR REPORT

The National Environmental Protection Agency Act of 1969 (NEPA) directs Federal agencies to examine the consequences of proposed activities in the light of an overall goal to protect and enhance the human environment. The agencies must examine direct and observable effects plus secondary impacts that may be indeterminate and not easily recognized. These secondary impacts of transportation projects include such areas as changes in land use, water quality, wildlife habitats, population density, and much more. Possible mitigation of secondary impacts is the subject of considerable concern and debate around the country and can lead to significant delays of transportation projects. The Wisconsin Department of Transportation is working with the Minnesota Department of Transportation to address secondary impacts of build options proposed for the St. Croix River Crossing project. Because the existing bridge and proposed bridges would cross a federally-designated "wild and scenic river," there are significant challenges in minimizing the impacts of any potential construction.

The WisDOT RD&T Program was asked to investigate what innovative and successful mitigation practices are in use around the country for addressing secondary impacts of transportation projects. Where possible, we were asked to identify other highly sensitive bridge projects and the mitigation practices employed to address their secondary impacts. The overall mitigation policies of other state departments of transportation are also of interest as WisDOT works to develop new policies of its own.

SUMMARY

There is a significant amount of information and resources available on the secondary impacts of transportation projects and how to address NEPA requirements. However, most of this information is focused on identifying the impacts rather than strategies for mitigating them. The issue is significant nationally with the Federal Highway Administration and American Association of State Highway Transportation Officials getting involved extensively to help states address the growing concerns over transportation impacts.

Below we summarize the most recent research that relates to mitigating the secondary impacts of transportation projects. Several of these studies include case studies and specific examples of how other states are handling mitigation. We follow with a listing of some of the most comprehensive Web sites dedicated to environmental stewardship and planning in transportation. These sites also provide a wealth of information on state environmental policies and case studies. We end with a listing of upcoming events that provide an opportunity to hear directly from state transportation professionals around the country who are addressing the same challenges.

RESEARCH IN PROGRESS

Assessment and Mitigation Strategies for Land Development Impacts of Transportation Improvements, NCHRP Project 25-25, Task 3

http://www4.trb.org/trb/crp.nsf/0/ba633c965c77eb9585256b9900453dd0?OpenDocument

Land development and its many environmental consequences have been identified as secondary impacts of transportation projects. This study aims to identify techniques used to predict, control or mitigate these impacts. The final report is under review currently and will be published very soon.
Contact: Chris Hedges, TRB Senior Program Officer, 202-334-1472

Alternative Mitigation Strategies/Early Mitigation: Streamlining and Achieving Net Benefits for the Natural Environment, NCHRP Project 25-25, Task 10

http://www4.trb.org/trb/crp.nsf/0/ba633c965c77eb9585256b9900453dd0?OpenDocument

With an estimated completion date in the fall 2005, this project will identify alternative methodologies for accomplishing early mitigation/conservation and addressing both DOT and resource agency needs.
Contact: Chris Hedges, TRB Senior Program Officer, 202-334-1472

Secondary/Indirect and Cumulative Effects Analysis, NCHRP Project 25-25, Task 11

http://www4.trb.org/trb/crp.nsf/0/ba633c965c77eb9585256b9900453dd0?OpenDocument

The objective of this study is to review, summarize and evaluate statutory and regulatory requirements and implementing guidance related to assessment and mitigation of secondary/indirect and cumulative impacts of transportation projects. This project began in 2004 and is expected to be completed in fall 2005.
Contact: Chris Hedges, TRB Senior Program Officer, 202-334-1472

COMPLETED RESEARCH

Environmental Stewardship Practices, Policies, and Procedures for Road Construction and Maintenance, NCHRP Project 25-25, Task 4, September 2004

Project description on the TRB Web site:
http://www4.trb.org/trb/crp.nsf/0/ba633c965c77eb9585256b9900453dd0?OpenDocument
Final report online at http://environment.transportation.org/research_news/nchrp/NCHRP-25-25-04.pdf
This comprehensive report is a compendium of environmental stewardship practices in transportation-related construction and maintenance. Highlighting the best practices of state transportation agencies both at the organizational level and in specific functional areas, the report serves as a guide for state DOTs in the development of Environmental Management Systems and environmental strategic plans.

Chapter 3 provides the most detail about specific mitigation or environmental design techniques in use around the country, covering wetland management, bridge construction, wildlife habitats, vegetation, and much more. The focus overall is on active, collaborative planning to achieve environmental goals. Below are just a few highlights:

- The Oregon Department of Transportation has included a policy in its long-range plan to, among other things, maintain or improve the natural and built environment, including fish passage and habitat, wildlife habitat and migration routes, vegetation, and wetlands. The long-range transportation plans of Colorado and North Carolina each contain specific references to goals or policies to conserve ecosystems.
- Few transportation departments are maintaining habitat except for wetland mitigation sites, though creative conservation partnerships have been developed in a number of states through in-lieu fee arrangements. Texas, Tennessee, Kentucky, North Carolina, and Florida are among the DOTs that provide funding instead of mitigation. Habitat management is frequently the responsibility of the agency or partnering organization holding title to the land or conservation easement.
- Washington DOT has been pursuing watershed characterization research to better understand how watersheds store water naturally (e.g., wetlands, riparian areas, floodplains) and then identify where land use has resulted in the loss of natural storage capacity. So far, the agency has found that investments in watersheds with lower areas of impervious surface may yield greater marginal benefits than mitigation sited close to impact areas. Hence, WSDOT has directed mitigation investments to restoring natural, self-maintaining systems that provide many other valuable watershed functions such as groundwater recharge, water quality treatment and fish and wildlife habitat, along with aesthetic, recreational, and educational values to residents.

The report includes numerous links to the online policies and procedures of state DOTs, as well as federal information Web sites and other resources referenced in the writing of the report.

Mitigating Transportation's Ecological Impacts, NCHRP Synthesis 302, 2002
Full report online at http://trb.org/publications/nchrp/nchrp_syn_302.pdf
This report provides an overview of current transportation agency practices, recent literature findings, and research on measures to mitigate the environmental impact of transportation projects. The study includes a survey of transportation and environmental professionals to document their experiences with ecological mitigation processes. Twenty-seven transportation agencies, representing every region in the country, provided responses. The chapters are broken down as follows:

Chapter 1 provides an introduction to the study
Chapter 2 provides the regulatory framework for ecological mitigation.
Chapter 3 presents the types of impacts and the ecological impact assessment tools used by transportation agencies.
Chapter 4 presents a discussion on when mitigation is provided, the type of mitigation used, and monitoring requirements and methods used to evaluate mitigation success. Below are a few highlights:

- 50% of those surveyed used wetland restoration and enhancement for more than 80% of their mitigation needs. Others used a combination of creation, restoration, enhancement, and preservation.
- Transportation agencies have also provided mitigation to improve highway permeability by providing specialized overpasses and underpasses for wildlife crossing with the goal of maintaining habitat connectivity and reducing road kills.
- DOTs are also using new culvert designs to improve fish passage in new roadways and retrofits.
- New technologies are being incorporated into some roadway designs to treat stormwater runoff and improve water quality to protect aquatic organisms.
- Monitoring methods varied greatly in terms of level of detail and frequency of the monitoring.

Chapter 5 discusses the cost of mitigation activities.
Chapter 6 presents three case studies of on-going ecological mitigation activities. Below is one example.

- To help reduce delays in construction, the North Carolina Department of Transportation focused on creating wetland mitigation sites in advance of projects so that they would already be available and successful. They also created the Full Delivery Project, in which they purchase wetland mitigation and stream restoration from private firms. The firms are responsible for the full development of the wetland mitigation banks and NCDOT reimburses the private firm on a per-credit basis for each bank site.

Chapter 7 discusses the inconsistency of assessment methods and decision making due to the lack of a standard ecological assessment methodology, the application of regulations, and approval of mitigation strategies.
Chapter 8 discusses the need for information transfer exchange and possible mechanisms that could be devised to meet this need.
Chapter 9 provides a summary of the findings.
Appendix A includes a copy of the questionnaire, Appendix B contains a list of respondents, and Appendix C provides examples of environmental documents referenced within this report.

Desk Reference for Estimating the Indirect Effects of Proposed Transportation Projects, NCHRP Report 466, 2002
Full report online at http://trb.org/publications/nchrp/nchrp_rpt_466.pdf
This manual is organized around an eight-step framework for estimating the indirect effects of transportation projects. It is intended as a reference manual for transportation professionals who need to identify strategies for reducing adverse impacts.

The section called Methods under Course Module 10 contains information on current mitigation techniques:
Access Controls**:** Controlling the extent and location of complementary development and regional development shifts through modifications to the access plan for the facility (interchange locations, traffic patterns, frontage roads, etc.)
Context Sensitive Design: Implementing changes in design standards to allow the facility to fit the scale and style of its surroundings.
Zoning/Comprehensive Planning: Regulating the density and use to which land may be put. Land-planning process should run concurrently with the transportation-planning process.
Transfer of Development Rights: Allowing property owners in areas where development has been restricted to sell a portion of the unusable development potential of their land to properties in areas where the government would like to encourage more intensive development.
Growth Management Regulation: Pursuing regulatory strategies that allow for regulation of the timing and location of residential and commercial development in a manner not addressed by traditional zoning.

Resource Management and Preservation Regulations: Using regulations designed to protect vital resources as a way to guide the path and intensity of development and limit impacts on notable features (coastal zone management, watershed management, etc.)
Land Acquisition/Conservation Easements: Purchasing or accepting donations of land and pledging to keep the land permanently undeveloped.

Guidelines for Selecting Compensatory Wetlands Mitigation Options, NCHRP Report 482, 2002
Full report online at http://gulliver.trb.org/publications/nchrp/nchrp_rpt_482.pdf
Research Results Digest summary of this project is online at
http://gulliver.trb.org/publications/nchrp/nchrp_rrd_251.pdf
This report provides guidance on selecting the most appropriate compensatory strategies to mitigate the effects of transportation projects on wetland habitats. Based on a comprehensive review of mitigation practices in the United States, the report discusses the advantages and disadvantages of various approaches and presents guidelines that an agency can use to select mitigation options that will have the greatest chance of success. The report includes case studies of state departments of transportation efforts to mitigate unavoidable wetland losses. It also provides examples of banking agreements used across the nation.

Environmental Commitment Implementation, Innovative and Successful Approaches, FHWA Domestic Scan, 2002
Full report online at http://environment.fhwa.dot.gov/strmlng/domScanRpt/index.htm
In 2002, the FHWA visited seven state DOTs to review successful processes, procedures, and methodologies used in fulfilling environmental commitments made in the transportation project development process and environmental permits. This report documents that scan and offers a variety of options to other DOTs looking for effective ways to incorporate environmental stewardship into their transportation planning.

ONLINE RESOURCES

Federal Highway Administration Planning, Environment and Realty Web Site
http://www.fhwa.dot.gov/environment/
This comprehensive site provides information on environmental regulations and procedures, including NEPA requirements and guidance on how state transportation agencies can meet these requirements.
(http://environment.fhwa.dot.gov/projdev/index.htm)

Of particular interest is the State Environmental Streamlining Practices Database
(http://environment.fhwa.dot.gov/strmlng/es6stateprac.asp)
By clicking on a U.S. map, users can access contact information for all environmental streamlining projects or programs listed for each state.

AASTHO Center for Environmental Excellence
http://environment.transportation.org/indexnew.htm
This site is a tremendous resource for transportation professionals in the field of environment. It contains numerous case studies, best practices, guidance documents, presentations, current news, and more in the area of environmental stewardship, planning and mitigation for transportation projects.

One area of the site focuses specifically on secondary and cumulative impacts and provides links to success stories, training information and reports.
http://environment.transportation.org/environmental_issues/secondary_indirect_cumulative_impacts/overview.htm

AASHTO Environmental Stewardship Demonstration Program (part of AASHTO Center for Environmental Excellence)
http://itre.ncsu.edu/aashto/stewardship/proj_view-APP.asp
This site provides links to numerous examples of how states have incorporated environmental stewardship into their transportation planning. Below are a few of the projects related to bridge reconstruction or removal:
Virgin River Bridge, Utah: http://www.itre.ncsu.edu/AASHTO/stewardship/projectinfo.asp?id=732
--describes measures to protect river during blasting, protect historic appearance, replacement of native plant species, construction of noise barrier, etc.
Bell Farm Bridge, Kentucky: http://www.itre.ncsu.edu/aashto/stewardship/projectinfo.asp?id=445
--construction approach to avoid impact on endangered mussels in the creek

Arkansas Historic Bridge Management System: http://www.itre.ncsu.edu/aashto/stewardship/projectinfo.asp?id=515
--goals of centralizing historic bridge data in a GIS; monitoring and analyzing trends in distribution and replacement of historic bridges; improving the marketing of historic bridges; and enhancing mitigation techniques used during the historic bridge replacement process

Center for Transportation and the Environment
http://152.14.30.150/CTE/index.html
Funded by the U.S. Department of Transportation and the North Carolina Department of Transportation, the Center for Transportation and the Environment conducts research, education, and technology transfer that seek to mitigate the impacts of surface transportation on the environment. The site provides information about completed and current research projects and educational opportunities. See below for information about an upcoming conference sponsored by this Center.

FHWA NEPA Community of Practice Web Site
http://nepa.fhwa.dot.gov/ReNepa/ReNepa.nsf/home
This site supports an open exchange of knowledge, information, experience, and ideas about the National Environmental Policy Act, related environmental issues, and transportation decision making. Through online discussion groups the site provides additional opportunities to explore solutions for balancing transportation need and the social, economic, cultural, and natural environment.

Lessons Learned in Assessing Indirect and Cumulative Impacts of Transportation Projects, Teleconference Series #31, Original Broadcast Date: August 26, 2004
http://152.14.30.150/cte/TechTransfer/Teleconferences/webcast.asp?ID=31
This teleconference explored some of the most useful strategies employed to date for conducting indirect and cumulative assessments that lead to better NEPA decisions. The broadcast featured case studies from the Lower Manhattan Redevelopment Project, Maryland's I-270/US-15 Multimodal Corridor Study, and North Carolina's Monroe Bypass Project.
Mr. Lamar Smith (Moderator), Team Leader for Training, Technical Assistance, and Information Technology, Office of Project, Development and Environmental Review, Federal Highway Administration (Washington, DC), (202) 366-8994, lamar.smith@fhwa.dot.gov

UPCOMING EVENTS

8th National Mitigation & Conservation Banking Conference: Environmental Banking & Beyond, April 18-21, 2005, North Carolina
http://www.mitigationbankingconference.com/mitigation_banking_home.htm
This conference features hands-on sessions and fieldtrips, case studies, legislative information, new ideas and practices, and the presentations by a wide range of individuals involved in mitigation, from both the public and private sectors. See the comprehensive agenda online. Proceedings from last year's conference are also available online for a fee.

Scenario Planning for Better Transportation Decision Making, March 3, 2005 (2:00-4:00 p.m., EST)
http://152.14.30.150/cte/TechTransfer/Teleconferences/2005schedule.asp
This live, two-hour national broadcast will feature scenario planning leaders and practitioners who will discuss how land-based scenario planning might fit within the context of the metropolitan and statewide transportation planning and decision-making processes. The panel will examine lessons learned from three initiatives underway in California, Idaho, and Utah. In addition, the panel will discuss the range of available software tools and technical assistance, as well as future research needs. This program will include an interactive question and answer session between the panel and national audience. Users can participate via Web conference.